DEPARTMENT OF THE TREASURY
FEDERAL LAW ENFORCEMENT TRAINING CENTER
GLYNCO, GEORGIA 31524

FLETC DIRECTIVE (FD)	NUMBER: 67-92.A
Subject: HEAT STRESS	DATE: 09/07/93 Sunset Review:

1. PURPOSE. This directive promulgates the standard policies and procedures for dissemination of heat stress information and warnings to all elements engaged in outdoor training and activities at the Federal Law Enforcement Training Center (FLETC) for the purpose of protecting the health and safety of instructors, students, and staff.

2. SCOPE. The policies of this directive apply to all official outdoor training and approved fitness activities conducted by the FLETC and Participating Organizations (POs) at all FLETC facilities. The procedures apply to Glynco, Georgia, only. The procedures for the Office of Artesia and Tucson Operations (OATO) are set forth in OATO SOPs and Office Guides.

3. CANCELLATION. FLETC Directive 67-92.A, Heat Stress, January 29, 1988, is superseded.

4. REFERENCES.

a. American College of Sports Medicine. Position stand on Prevention of Thermal Injuries During Distance Running. Indianapolis, American College of Sports Medicine, 1985.

b. Armstrong, L.E. and K.B. Pandolf. Physical Training, Cardiorespiratory Physical Fitness and Exercise-heat Tolerance, in Pandolf, K.B., Sawka M.N., and R.R. Gonzalez (eds): Human Performance, Physiology and Environmental Medicine at Terrestrial Extremes. Indianapolis, Benchmark Press Inc. 1988, pp 199-226.

c. Cooke, A. Recruit Training Reform. Law and Order. 37(3):47-50, 1989.

d. Hanson, P.B. Stress in Sports, Exercise, and Fitness Tests, in Cureton, T.K. Jr. (ed): Encyclopedia of Physical Education, Fitness and Sports: Human Performance, Efficiency and Improvements in Sports, Exercise, and Fitness. Reston, Virginia, American Alliance for Health, Physical Education, Recreation, and Dance, 1985, pp 317-327.

e. Haymes, E.M. and E.R. Buskirk. Prevention of Heat Injury, in Stull, G.A. (ed): Encyclopedia of Physical Education, Fitness and Sports: Training, Environment, Nutrition, and Fitness. Salt Lake City, Utah, Brighton Pub. 1980, pp 139-149.

f. Haymes, E. M. and C.L. Wells. Environment and Human Performance. Champaiqn, IL, Human Kinetics, 1986, pp 13-41.

g. Herbert, W.G. Water and Physical Performance, in Stull, G.A. (ed): Encyclopedia of Physical Education, Fitness and Sports: Training, Environment, Nutrition, and Fitness. Salt Lake City, Utah, Brighton Pub. 1980, pp 150-160.

h. Hubbard, R.W., and L.E. Armstrong. Hyperthermia: New Thoughts on an Old Problem. Physician and Sports Medicine. 17(6):97-113, 1989.

i. Roberts, W.O. Managing Heatstroke. Physician and Sports Medicine. 20(5):17-28, 1992.

j. Strydom, N.P. and C.H. Wyndham. Recommendations for Athletes to Prevent Heat/Dehydration Injury, in Cureton, T.K. Jr. (ed): Encyclopedia of Physical Education, Fitness and Sports: Human Performance, Efficiency and Improvements in Sports, Exercise, and Fitness. Reston, Virginia, American Alliance for Health, Physical Education, Recreation, and Dance, 1985, pp 328-338.

k. Wells, C.L. Physiological Effects of a Hot Environment Upon Physical Performance, in Stull, G.A. (ed): Encyclopedia of Physical Education, Fitness and Sports: Training, Environment, Nutrition, and Fitness. Salt Lake City, Utah, Brighton Pub., 1980, pp 123-139.

5. DEFINITION. Wet Bulb Globe Temperature (WBGT) Index. The WBGT Index is a generally accepted measure of heat stress. The index combines the wet bulb temperature (a measure of the cooling power of the environment in relation to temperature and air moisture content) with globe temperature (a measure of the radiation absorbed from the environment) and dry bulb temperature (a measure of air temperature). The wet bulb temperature receives the greatest weight because it is the most important during exercise.

6. GENERAL. The performance of physical activity during conditions of high temperature and humidity presents a potential health threat to the instructor, student, and staff. When exercising in a hot and humid environment, the body's system for maintaining a constant body temperature can fail if the rate of evaporative heat loss is insufficient for the amount of heat gained by the body. When the total heat load exceeds the capacity of the body to handle these increases, certain degrees of incapacitation occur. These difficulties may take the form of heat cramps, heat fatigue, heat exhaustion, or heat stroke. The monitoring of conditions that lead to heat stress is a preventive health and safety measure and is applicable to all personnel exposed to a thermally stressful environment.

7. POLICY.

a. When the NBGT Index reaches the numerical readings in categories I through V, appropriate warnings will be posted via the flagpole located near the outdoor 400m track at the Physical Techniques Division (PTD) complex: and on bulletin boards located throughout the PTD complex.

b. Upon obtaining the WBGT category, training will be conducted as follows:

(1) Category I - WBGT Index of 65 - 81.9° F: All activities will proceed as usual; however, instructors will not allow students to wear sweat clothing during outdoor activities and the wearing of sweat clothing will not be permitted for any staff or students using the outside PTD facility (track, obstacle course). The prohibition of sweat clothing for outdoor activity applies to categories I through V. (This category is consistent with guidelines established in the position stand of the American College of Sports Medicine on "The Prevention of Thermal Injuries During Distance Running.")

(2) Category II - WBGT Index of 82 - 84.9 degrees F: All activities will proceed as usual; however, instructors should make frequent inquiries and observations of the students as to their physical condition and, if necessary, take appropriate action such as rest breaks and fluid intake.

(3) Category III - WBGT Index of 85 - 87.9 degrees F: Intense physical activities such as endurance running (half-mile and longer), intense calisthenic conditioning, obstacle course testing, shotgun stress, and similar activities are to be modified to reduce sun exposure and should be more strictly supervised. A 10-minute rest period will be provided each hour with fluids available for replacement of lost body fluids.

(4) Category IV - WBGT Index of 88 - 89.9 degrees F: The intense physical activities as noted in Category III are to be conducted inside, or reduced in intensity and constantly supervised. Additional rest periods will be provided. In any 2-hour training session, 10-minute breaks will be provided at 25-minute intervals with fluids available for replacement of lost body fluids. During Category IV conditions, the utilization of a "follow-on" vehicle is mandatory. The vehicle will be equipped with the following heat stress prevention items: water coolers, ice chest, cold towels, and other appropriate safety items. The instructor is responsible for obtaining these items from the Athletic Trainer's office prior to class.

(5) Category V - WBGT Index of 90 degrees F and above:

(a) All physical training activities will be conducted indoors. If the WBGT category changes from IV to V while training is already occurring outdoors, the training will be immediately moved indoors. Alternatives to outdoor aerobic conditioning during Category V include exercise bikes, indoor swimming pool, circuit training in the weight training area, and general calisthenics in the matted rooms.

(b) The 1.5 mile run segment of the PEB will not he conducted during Category V.

(c) All other outdoor FLETC training courses such as surveillance, execution of search warrant, firearms, and driver training will require fluid replacement and rest periods.

8. RESPONSIBILITIES.

a. The Athletic Trainer is responsible for determining and disseminating WBGT Index readings. When infractions of the policies or procedures set forth in this directive are reported or observed, it is the responsibility of the Senior Athletic Trainer to meet with the instructor involved and file a complete report to the Chief, Physical Techniques Division.

b. Each Instructor and/or Supervisor is responsible for:

(1) Reading and understanding this directive's attachment, "Heat Stress and Exercise";

(2) directing students to read the attachment, "Heat Stress and Exercise" which will be provided in the student notebook:

(3) monitoring WBGT readings prior to and during outdoor training by observing the Heat Stress flag color or by contacting the Heat Stress Alert Systems (HSAS) on weekdays only at extension 2944. If there is no answer, conditions are below a category I. If there is a busy signal, dial *5 for a call back. Any questions regarding the HSAS should be referred to the Athletic Trainer's office at extension 2249; and

(4) closely monitoring the development of potential heat disorders, and acting in accordance with the procedures of this directive to protect both students and staff against heat/health problems. During periods involving any of the five categories, particularly for students who have not been in a hot and humid climate for at least 10 days, potential heat problems must be anticipated and closely monitored.

c. Participating Organization Representatives are responsible for:

(1) Obtaining towels, sheets, ice, and fluids in sufficient quantity for student and instructor use in programs they supervise. These items are available from the Athletic Trainer; and

(2) monitoring WBGT readings on an hourly basis by contacting the HSAS.

d. Participating Organization Representatives and/or Instructors conducting outdoor training are responsible for taking appropriate action as outlined in sections 9 f, g, h, and i of this directive upon notification of heat stress conditions.

e. Division Chiefs are responsible for ensuring that their staff are thoroughly familiar with the contents of this directive and their associated responsibilities described herein.

f. All FLETC and PO Staff will receive a copy of the attachment, "Heat Stress and Exercise" via Center distribution to inform and remind them of the potential health hazards associated with exercising in the heat.

9. PROCEDURES.

a. Monday through Friday, the WBGT Index will be determined every hour by the Athletic Trainer at times commensurate with the severity of the heat. All index readings will be recorded in a permanent log book maintained by the Athletic Trainer

b. When the WBGT Index reaches reportable categories, the Athletic Trainer will immediately display the appropriate flag indicating the heat stress category. Simultaneously, the prerecorded message in the HSAS automatic answering service will be changed. The HSAS is not operational on weekends.

c. On weekends and holidays, the WBGT categories can be obtained by telephoning the FLETC Security Police. Index readings will be taken and recorded in the permanent log book by the Equipment Issue personnel. When the WBGT Index reaches reportable categories, the Equipment Issue personnel will immediately display the appropriate flag, indicating the heat stress category and inform FLETC Security Police of the category.

d. Based upon the heat category, a colored flag will be raised on the centrally located flagpole at the PTD complex. The flag colors are:

(1) Blue - Category I - WBGT Index 65 degrees - 81.9°
(2) Green - Category II - WBGT Index 82 - 84.9 degrees
(3) Yellow - Category III - WBGT Index 85 - 87.9 degrees
(4) Red - Category IV - WBGT Index 88 - 89.9 degrees
(5) Black - Category V - WBGT Index 90 degrees and above

e. Class presentations should be arranged so that normal "down" periods will be spent as rest periods in cool, shaded areas. Care should be taken to avoid hot brick or concrete surfaces and walls which radiate heat. Clothing should be loosened during the rest break to facilitate heat loss.

f. In all exposed training areas which can normally be expected to present heat problems, cold electrolyte liquids and ice water will be available for students and

instructors. These areas include, but are not limited to, the quarter-mile track, obstacle course, outdoor firearms ranges, and driver training courses. Adequate liquid intake is a normal precaution in heat situations; students will be strongly encouraged to consume 4-ounces of fluid every 15-minutes, or 8-ounces every 30-minutes. The volume consumed should be dependent on both the stressfulness of the environment and the exercise conditions.

g. Cold towels and sheets are to be available on weekdays during training hours only and used as necessary. Use of cold towels and sheets should become more critical as higher categories are experienced.

h. Strict supervision will be maintained for all physical training activities during Categories I, II, III and IV in areas removed from the main training complex. Instructors will make provisions to have immediate access to emergency transportation and treatment supplies.

10. OFFICE OF PRIMARY INTEREST. Office of Special Training, Physical Techniques Division.

Charles F. Rinkevich
Director

Attachment

HEAT STRESS AND EXERCISE

General Education on Heat Illness

Anyone performing activity in the heat should be aware of and understand the factors associated with impairment of the body's ability to maintain a safe internal temperature. When exercising in the heat, the sweating/cooling system and the exercising muscles compete for their fair share of the circulation in order to do their specific jobs more effectively. There are many factors (listed below) that increase the demand on the body's cooling system and limit its effectiveness. The more factors an individual possesses, the greater the hindrance to the body's cooling mechanism; and the exercise session should be adjusted accordingly. Individuals should also be aware of the early symptoms of heat illness which include: clumsiness, stumbling, excessive sweating (and also cessation of sweating), headache, nausea, weakness, cramps, dizziness, apathy, and gradual or sudden impairment of consciousness. It is recommended that recreational runners travel in groups or with a partner in order to continually monitor symptoms of heat illness.

FACTORS THAT INCREASE THE LIKELIHOOD OF HEAT ILLNESS

1. Hot and Humid Environment

The combination of elevated air temperature (generally above 60°F), elevated humidity (generally above 50 percent), radiant heat from the sun, and air movement dictates the level of heat stress on the body. A heat stress monitor is used to measure all four factors and provide a Wet Bulb Globe Temperature (WBGT) reading which identifies the amount of thermal stress on the body. The FLETC uses a system of flags to represent the various levels of heat stress and their impact on the body.

2. Low Level of Aerobic Fitness

A low level of cardiovascular fitness dramatically limits the cardiovascular system's ability to provide adequate circulation for cooling as well as for exercising. Individuals with high levels of cardiovascular fitness demonstrate a faster rate of acclimation and can better tolerate heat stress during the adjustment process.

3. Increased Age

Individuals of increased age generally have a reduced heat tolerance and, therefore, have a greater demand on their cardiovascular system while exercising in the heat.

4. Increased Level of Body Fat

Excessive body fat limits the body's ability to transfer heat from the core to the surface for cooling. Additionally, the body produces more heat for a given activity due

to the additional weight (fat) carried and is hindered in its attempt to lose that heat due to the excessive fat.

5. No Acclimatization to Heat and Humidity

Daily exposure to heat and humidity while exercising provides a gradual acclimation to that environment. By gradually increasing the length of exposure up to 90 to 120 minutes per day, the body will acquire a more effective sweating response, lower heart rate, and internal body temperature during exercise in the heat. The acclimation process will require 10 to 14 days to receive maximum benefit.

6. Improper Clothing

White or light colored clothing will absorb less radiant heat than darker colors. Clothing that is all cotton allows more evaporative cooling than polyester blends and should be loose fitting. Sweat clothes and rubber suits limit or stop the sweat evaporation process and should not be worn while exercising in the heat. In a hot environment, evaporative cooling is the only way the body can maintain a normal core temperature. When this process is thwarted, COLLAPSE IS IMMINENT AND SERIOUS INJURY OR DEATH MAY OCCUR. Restricting the body's ability to lose heat in a heat stress environment can rapidly become A LIFE-THREATENING SITUATION and should never be attempted.

7. Previous Heat Illness Problem

Individuals who have previously experienced heat illness demonstrate a reduced capacity to tolerate future heat stress situations. The body loses its ability to respond efficiently to the heat and humidity, and the symptoms of heat stress are apparent within a shorter time period than previously experienced by the individual.

8. Dehydration from Insufficient Water Intake, Recent Exercise, or Alcohol Consumption

The body can quickly become dehydrated in a hot environment. Individuals who exercise in the heat should always drink additional fluid before, during, and after an activity as the thirst response is a slow and poor indicator of the body's current fluid status. Starting out well hydrated is critical to safe performance in the heat as the body can lose fluid (through sweating) at a rate three to four times that which it can replace it (drinking and absorption into the body). Water is the primary component of sweat and blood; when it is not sufficiently replaced, the body's ability to control heat loss and circulation is compromised. Alcohol acts as a diuretic as it promotes the loss of body water. Alcohol consumption should be avoided 24 hours prior to exercise in the heat due to its negative impact on body fluid regulation.

9. Current Infection or Gastrointestinal Problem

Almost any type of illness raises the body's core temperature and places it near the heat stress threshold without engaging in any vigorous activity or experiencing a hot environment. The body's ability to regulate temperature is involved with the existing fever and has very little reserve to handle the tremendous thermal demands of exercise in a hot environment. The risk of collapse is quite high for febrile (feverish) individuals exercising/working in the heat.

10. Inadequate Food and Electrolyte Intake

Proper food intake is essential to maintain energy for the caloric demands of exercise and temperature regulation. During the heat acclimation process, the sweat glands minimize salt (sodium chloride) loss; a normal intake of salt combined with a balanced meal plan should provide adequate nutrition for work in the heat. Dieting (severe calorie restriction) limits both the body's supply of energy for activity and the replacement of nutrients due to the hot environment. (Fruits and vegetables are lent .sources of electrolytes that are required by the body.)

11. Current Use of Medication Which Alters Fluid Balance

Several medications (such as diuretics) limit the body’s normal regulation of fluids. Individuals who take medications should determine, along with their physician, if their capacity to exercise in the heat is in any way limited by their medication and take the necessary precautions.

12. Abnormal Sweat Gland Function

Although found in a very small percent of the population, certain individuals have an insufficient number of sweat glands or an ineffective sweating response. These individuals should make this information known to the medical staff so that the necessary precautions can be made.